

April 23, 2009

Ms. Pat Abel
Department of Conservation
Division of Oil Gas and Geothermal Resources
5075 Bradley Road, Suite 221
Santa Maria, California 93455-5077

RE: Northwest Casmalia Oil Field Waste Water Disposal Project Request for Minor Aquifer Exemption Santa Barbara County, California

Dear Pat,

On April 2, 2009 you forwarded an e-mail to me from George Robin of the Environmental Protection Agency (EPA) citing the criteria and required documents for the approval of an aquifer exemption request under 40 CFR Parts 144.7 and 146.4 for a proposed Class II waste water (produced water) injection project at Santa Maria Pacific, LLC's (SMP) North West Casmalia Oil and Gas Field, located in Santa Barbara County California (Figure 1 and Figure 2).

Based on Mr. Robin's e-mail, the following responses address each of the criteria for an aquifer exemption approval for the Casmalia Field under 40 CFR:

§ 146.4 Criteria for exempted aquifers.

An aquifer or a portion thereof which meets the criteria for an "underground source of drinking water" in §146.3 may be determined under 40 CFR 144.8 to be an "exempted aquifer" if it meets the following criteria:

- (a) It does not currently serve as a source of drinking water; and
- (b) It cannot now and will not in the future serve as a source of drinking water because:
- (1) It is mineral, hydrocarbon or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible.

- (2) It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical;
- (3) It is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption; or
- (4) It is located over a Class III well mining area subject to subsidence or catastrophic collapse; or
- (c) The total dissolved solids content of the ground water is more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water system.

§ 144.7 Identification of underground sources of drinking water and exempted aquifers.

- (2) For Class II wells, a demonstration of commercial producibility shall be made as follows:
- (i) For a Class II well to be used for enhanced oil recovery processes in a field or project containing aquifers from which hydrocarbons were previously produced, commercial producibility shall be presumed by the Director upon a demonstration by the applicant of historical production having occurred in the project area or field.
- (ii) For Class II wells not located in a field or project containing aquifers from which hydrocarbons were previously produced, information such as logs, core data, formation description, formation depth, formation thickness and formation parameters such as permeability and porosity shall be considered by the Director, to the extent such information is available.
- **SMP Response:** The proposed zone of injection is within the Monterey formation which appears to be a continuous extension of the oil productive Monterey formation within the 100 year old California State Designated Casmalia Oil Field located approximately 2 miles south west (down dip) of SMP's Casmalia operations (Figure 3).

SMP's NW Casmalia Field is situated in an area that consists of uplifted marine formations that exist within the Casmalia Hills outside the bounds of the SMV Basin. The oil exploration and production target zone is located within the Tertiary geologic period of the lower Pliocene and upper Miocene epoch within the formations commonly referred to as the Sisquoc and Monterey respectively. Both formations are oil bearing in the Casmalia Hills area (Figures 4 through 7). Neither formation contains fresh water. The area of oil development interest is situated where surface outcrops of the two zones occur eliminating the possibility of overlying perched groundwater zones to be present.

The uppermost layer of groundwater, if present, is characterized as a layer of brackish water perched atop layers of soil and gravel and in the cracks of bedrock that blanket the Casmalia Hills. The source of the small amount of perched groundwater encountered in

the Casmalia Hills is a result of rain water that percolates through the upper soil horizon(s) that accumulates in sediments and in fractures in the underlying bedrock. The bedrock underlying the Casmalia Hills drops downward to form the Santa Maria Valley Basin which is filled with gravel and sand deposits. The perched water layer is classified as non-potable for human use.

The nature of the oil extraction operation involves proprietary steam injection methods into the Sisquoc and Monterey formations. The injected steam does not contain concentrations of toxic substances or additives that could potentially cross contaminate the intended injection zones. The density of the steam that condenses into water is approximately equal to or slightly lower than the density of naturally occurring fluids within the targeted oil bearing formations. There is no evidence of circulation existing within the target zones. Based on these considerations the possibility of fluid migration away from the operations is virtually eliminated.

The Santa Maria Valley Groundwater Basin currently serves as the source of drinking water in the area. Water bearing units within the SMV Basin consist of alluvium, dune sands, and the Orcutt, Paso Robles, Pismo, and Careaga Formations. The NW Casmalia Oil and Gas Field is situated along the western/south south western edge of the Santa Maria Valley (SMV) Groundwater Basin (Figure 3). The SMV Basin is an alluvial basin that is located in the northwest portion of Santa Barbara County and extends into the southwest portion of San Luis Obispo County. The aquifer is essentially continuous with exception of clay lenses that cause localized confinement (2002 Santa Barbara County Groundwater Report – Santa Barbara County Public Works).

The town of Casmalia, Ca. is situated to the west of the subject site. Currently Casmalia receives its drinking water from a well completed in the Santa Maria Groundwater Basin located east of the NW Casmalia Oil and Gas Field. The well is operated by "Casmite" Corporation a subsidiary of Chevron. Groundwater is pumped from the water supply well, west, to a water supply tank situated above the town at a high point within the Casmalia Hills (east of town) from which Casmalia draws its domestic water needs (Figure 8).

Delineation and testing of the saturated diatomite reservoir within the Sisquoc formation at the NW Casmalia Field was initiated by SMP in June of 2005. To date a total of 16 oil and gas wells have been drilled and completed. An additional 29 oil and gas wells are planned and permitted under an existing Land Use Permit issued by the County of Santa Barbara issued to SMP in June of 2005 (Revised in July of 2007 and February of 2006). Three of the existing wells will be utilized as produced water injection wells when the field is operational. During the delineation and testing of the Sisquoc formation, four of the well borings were extended into the Monterey Formation displaying the following results:

• A mud log from SMP's 30821 drilled in 2005 displayed robust shows of hydrocarbon across the Monterey Formation (Attachment 1).

- The di-electric log in well 30511 calculates 25% to 40% oil saturation across the Monterey Formation (Attachment 2).
- A side wall core collected from well 30206 displayed good oil saturation (Attachment 3).
- Well 30622 was tested on primary production and producing 30 barrels of 15 degree API oil over a span of 11 days.

Based on this data, the Monterey formation contains hydrocarbons that are expected to be commercially producible.

Samples of the Monterey Formation fluid (water and oil) "30511 Water Sample" were collected from the "Stokes B 30511" oil and gas well on August 16, 2006. The aqueous sample was analyzed by Oil Field Environmental and Compliance, Inc. (a California State Certified Analytical Laboratory). The sample was analyzed for a variety of water quality parameters including Total Dissolved Solids (TDS) utilizing EPA Test Method 160.1. Analytical results displayed a TDS concentration of **5,400 mg/l**, which falls within the range of 3,000 mg/l and 10,000 mg/l which is not reasonably expected to supply a public water supply system as outlined above (Lab Reports are included in Attachment 4).

Based on the contents and discussions in this letter, SMP feels that an aquifer exemption for the NW Casmalia Field from EPA is warranted.

Please let us know if you need any additional information or if you have any questions or comments.

Sincerely,

Richard H. Field II Manager of Regulatory Affairs Santa Maria Pacific, LLC

Figures:

- Figure 1 Site Vicinity
- Figure 2 NW Casmalia Base Map with Aerial Photo
- Figure 3 Injection Area
- Figure 4 Top of Monterey Formation
- Figure 5 NE-SW Cross Section
- Figure 6 Casmalia Surface Geology
- Figure 7 Cross Section B-B'
- Figure 8 Casmalia Base Map Showing Casmite Well Locations and Town of Casmalia

Attachments:

• Attachment 1 – Monterey Formation Oil Shows in Stokes B 30821

- Attachment 2 Northwest Casmalia Monterey Saturation Observation
- Attachment 3 Sidewall Cores Analysis Results Stokes A 30206, Core Lab, March 3, 2006.
- Attachment 4 OEC Laboratory Reports Analytical Results Representing Casmalia Monterey Formation Fluid "Stokes B" 30511



DEPARTMENT OF CONSERVATION

DIVISION OF OIL, GAS AND GEOTHERMAL RESOURCES

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PHONE 916 / 445-9686 • FAX 916 / 323-0424 • TDD 916 / 324-2555 • WEBSITE conservation.ca.gov

September 24, 2008

George Robin
Water Management Division
U.S. Environmental Protection Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105

Re: Aquifer Exemption: Northwest Casmalia Water Disposal Project

Dear George,

Enclosed for your review is an aquifer exemption application from Santa Maria Pacific LLC for injection into the Monterey formation in a new oil and gas area northwest of the Casmalia oil field. The operator has drilled 16 oil and gas wells with plans to drill another 29 oil and gas wells. They would like to convert one or more existing wells to water disposal; however, they have to obtain an aquifer exemption since the proposed injection zone has a TDS of 5,800ppm.

Because the Monterey formation in the Casmalia oil field, which is a half-mile away, is actively under production and injection and that it is not reasonable to expect the proposed aquifer to supply a public water supply system, we recommend approval of the aquifer exemption application.

Please let me know if you need any additional information.

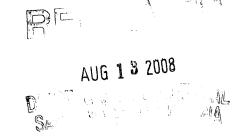
Sincerely,

Michael Stettner UIC Program Manager



August 7, 2008

Ms. Pat Abel
Department of Conservation
Division of Oil Gas and Geothermal Resources
5075 Bradley Road, Suite 221
Santa Maria, California 93455-5077



RE: Northwest Casmalia Oil Field Waste Water Disposal Project Request for Minor Aquifer Exemption Santa Barbara County, California

Ms. Abel

Per our meeting on June 5, 2008, Santa Maria Pacific, LLC (SMP) is requesting an "Aquifer Exemption" pursuant to the California Code of Regulations, Title 40, Subchapter D, and Sections 144.7(a) and (b) for a proposed Class II waste water (produced water) injection project at SMP's North West Casmalia Oil and Gas Field, located in Santa Barbara County California (Figure 1 and Figure 2).

The following information has been prepared using the Environmental Protection Agency's (EPA) Region IX "Aquifer Exemption Guidance", dated March 1993 as follows:

Injection Project History

An initial letter dated April 4, 2007 requesting the approval of the Department of Conservation Oil and Gas and Geothermal Resources (DOGGR) to inject steam into the Sisquoc formation for steam enhanced oil recovery pilot and to inject produced water from the Sisquoc into the upper Monterey formation, was sent to your office. The approval request letter included a project description, engineering study, geologic study, injection plan, and supporting site figures and documentation (Attachment 1).

Water injection testing of the "Stokes" 30511 well was performed by SMP during the months of April, May and June of 2007. The volumes of water injected into the Monterey Formation are summarized in the attached Injection Report Corrections Table (Attachment 2).

A second letter dated July 30, 2007 was sent to the District 3 Office and included the Notice of Intent (NOI) to convert the "Stokes B" 30511 oil and gas well into a water

injection well.

DOGGR responded with a subsequent Notice Receipt Acknowledgement dated August 13, 2007 (Attachment 3). The notice asked for additional project information to complete the project application, including; a letter of notification to the nearest offset operator, Greka Oil and Gas (sent to Greka on 8/21/07), an injection facilities schematic, contour map of the top of the injection zone without probable and current diatomite limits, and a labeled isopachous map of the injection zone without probable or current diatomite limits.

Regional Groundwater Basin

The NW Casmalia Oil and Gas Field is situated along the western/south south western edge of the Santa Maria Valley (SMV) Groundwater Basin (Figure 2). The SMV Basin is an alluvial basin that is located in the northwest portion of Santa Barbara County and extends into the southwest portion of San Luis Obispo County. The aquifer is essentially continuous with exception of clay lenses that cause localized confinement (2002 Santa Barbara County Groundwater Report – Santa Barbara County Public Works).

The SMV Basin has a surface area of 184,000 acres (287.5 square miles) and is bounded by the San Luis and Santa Lucia Ranges on the north, by the San Rafael Mountains on the east, by the Solomon Hills on the south, by the Casmalia Hills on the southwest, and by the Pacific Ocean on the west. Water bearing units within the SMV Basin consist of alluvium, dune sands, and the Orcutt, Paso Robles, Pismo, and Careaga Formations. Groundwater flow in the basin tends to follow the topography. Near the Casmalia Hills, water flows northward, away from the hills, then west toward the Pacific Ocean. Groundwater from the SMV Basin continues to be a source of drinking water for the towns of Casmalia, Santa Maria, Tanglewood, and Orcutt.

The SMV Basin is best described by Worts (1947, 1851), Miller and Evanson (1966), Ahlroth et al (1977) and Naftly (1994), as one of the largest agricultural and historical oil and gas producing valleys of California and has been studied extensively.

Historic Resource Recovery and Feasibility

In the early 1920's the Nevada-Texas-Utah Mine Company (NTU Mine Co.) operated a quarry and oil extraction facility within the boundaries of the NW Casmalia Field. The target of the NTU Mine was the extensive beds of oil-saturated diatomite present in the Casmalia Hills. In 1921 the Company leased 1,600 acres of the Stokes Ranch to test the feasibility of recovering oil from the locally exposed oil-bearing rock. At the time, the Stokes Property some of the largest such deposits in the region (Gore 1923; 219).

During the lifespan of the mining operation and estimated 30,000 to 40,000 tons of oil bearing rock was mined and treated resulting in the recovery of several thousand barrels of oil (Adams and Beatty 1962; Ball Associates, LTD 1964). The NTU Oil Recovery Operation was halted in 1928 citing that the "project was not economic".

Successive attempts were made by both Richfield Company (1950's and 1960's) and Union Oil (1980's) to evaluate the deposits and determine the feasibilities of extracting the resource. Both studies were abandoned due to poor economics (Adams and Beatty 1962; Ball Associates 1964; Elias 2004).

Oil and gas production in the Casmalia Hills area was established in 1905 within the California State designated Casmalia Field which is situated approximately two (2) miles to the southeast of SMP's NW Casmalia Field.

Localized Hydrogeology

SMP's NW Casmalia Field is situated in an area that consists of uplifted marine formations that exist within the Casmalia Hills outside the bounds of the SMV Basin. The oil exploration and production target zone is located within the Tertiary geologic period of the lower Pliocene and upper Miocene epoch within the formations commonly referred to as the Sisquoc and Monterey respectively. Both formations are oil bearing in the Casmalia Hills area. Neither formation contains fresh water. The area of oil development interest is situated where surface outcrops of the two zones occur eliminating the possibility of overlying perched groundwater zones to be present.

The uppermost layer of groundwater, if present, is characterized as a layer of brackish water perched atop layers of soil and gravel and in the cracks of bedrock that blanket the Casmalia Hills. The source of the small amount of perched groundwater encountered in the Casmalia Hills is a result of rain water that percolates through the upper soil horizon(s) that accumulates in sediments and in fractures in the underlying bedrock. The bedrock underlying the Casmalia Hills drops downward to form the Santa Maria Valley Basin which is filled with gravel and sand deposits. The perched water layer is classified as non-potable for human use.

The nature of the oil extraction operation involves proprietary steam injection methods into the Sisquoc and Monterey formations. The injected steam does not contain concentrations of toxic substances or additives that could potentially cross contaminate the intended injection zones. The density of the steam that condenses into water is approximately equal to or slightly lower than the density of naturally occurring fluids within the targeted oil bearing formations. There is no evidence of circulation existing within the target zones. Based on these considerations the possibility of fluid migration away from the operations is virtually eliminated.

NW Casmalia Oil Field Development Area

Delineation and testing of the saturated diatomite reservoir within the Sisquoc formation at the NW Casmalia Field was initiated by SMP in June of 2005. To date a total of 16 oil and gas wells have been drilled and completed. An additional 29 oil and gas wells are planned and permitted under an existing Land Use Permit issued by the County of Santa Barbara issued to SMP in June of 2005 (Revised in July of 2007 and February of 2006).

Three of the existing wells will be utilized as produced water injection wells when the field is operational.

A Technical Paper entitled "An Extension of a 100 Year Old California Oil Field, Casmalia Oil Field in Santa Barbara County, California" was presented by members of the SMP Technical Group at the 2008 Society of Petroleum Engineers Western Regional and Pacific Section AAPG Joint Meeting on April 1, 2008. The presentation outlines the oil saturated productive zones within the Sisquoc (Diatomite) and Monterey Formations. The presentation is included as Attachment 4 of this aquifer exemption request.

EPA Aquifer Exemption

According to 40 CFR, Section 147.7 may be determined to be an "exempted aquifer if it meets the following Criteria:

- 1) It does not currently serve as a drinking water source.
- 2) It cannot now and will not in the future serve as a source of drinking water because;
 - a) It is mineral, hydrocarbon or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or III operation to contain minerals of hydrocarbon that, considering their quantity and location, are expected to be commercially producible.
- 3) The total dissolved solids (TDS) content of the ground water is more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water supply system.

Responses to the above criteria are as follows:

1) The town of Casmalia, Ca. is situated to the west of the subject site. Currently Casmalia receives its drinking water from a well completed in the Santa Maria Groundwater Basin located east of the NW Casmalia Oil and Gas Field. The well is operated by "Casmite" Corporation a subsidiary of Chevron. Groundwater is pumped from the water supply well, west, to a water supply tank situated above the town at a high point within the Casmalia Hills (east of town) from which Casmalia draws its domestic water needs (Figure 3).

In the 1940's, Casmite commenced oil field operations in Santa Barbara County along U.S. Highway 1, halfway between San Luis Obispo and Santa Barbara. Casmite constructed a water system as part of the oil operations. As an accommodation, Casmite began to provide nearby residents with water from the system. In 1953, The Union Oil Company of California (Unocal) acquired all the stock of Casmite. In 1994, Unocal sold off the oil field operations but retained the water system. In 2005, Chevron Corporation (Chevron) acquired the assets of Unocal and as a result, although still owned by Unocal, is now a wholly owned subsidiary of Chevron.

- 2) The hydrocarbon resource is delineated by surface outcrops of oil saturated rock and some 41 oil wells (which have never produced commercially) in and around the project area. Oil production in the Casmalia Field, located approximately one and one-half miles southeast of the project has been ongoing since 1905, yielding over 46 million barrels of oil and 18 million standard cubic feet of natural gas. Currently, the Casmalia Field produces approximately 500 bbls/day of oil from 100+ oil wells. The Casmalia Field currently produces over 26,000 bbls/day of produced water which is injected into seven injection wells (completed within the Monterey) for secondary recovery and produced water disposal.
- 3) Samples of the Monterey Formation fluid (water and oil) "30511 Water Sample" were collected from the "Stokes B 30511" oil and gas well on August 16, 2006. The aqueous sample was analyzed by Oil Field Environmental and Compliance, Inc. (a California State Certified Analytical Laboratory). The sample was analyzed for a variety of water quality parameters including Total Dissolved Solids (TDS) utilizing EPA Test Method 160.1. Analytical results displayed a TDS concentration of 5,400 mg/l, which falls within the range of 3,000 mg/l and 10,000 mg/l which is not reasonably expected to supply a public water supply system as outlined above (Lab Reports are included in Attachment 5).

The oil component of the samples was analyzed to determine the API Gravity of the saturated hydrocarbons from the Monterey Formation by ASTM Method D-287. Analytical results displayed API Gravities of 8.9 and 9.0.

Based on the contents and discussions in this letter, SMP feels that an aquifer exemption for the NW Casmalia Field from EPA is warranted.

Please let us know if you need any additional information or if you have any questions or comments.

Sincerely,

Richard H. Field II

Manager of Regulatory Affairs

DULLEC

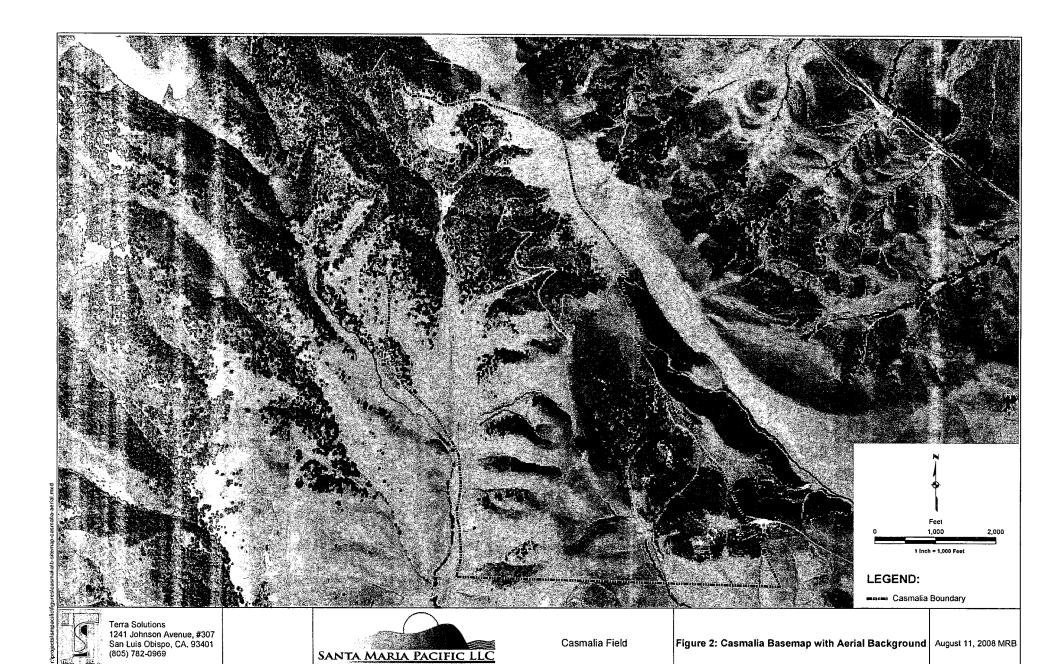
Santa Maria Pacific, LLC

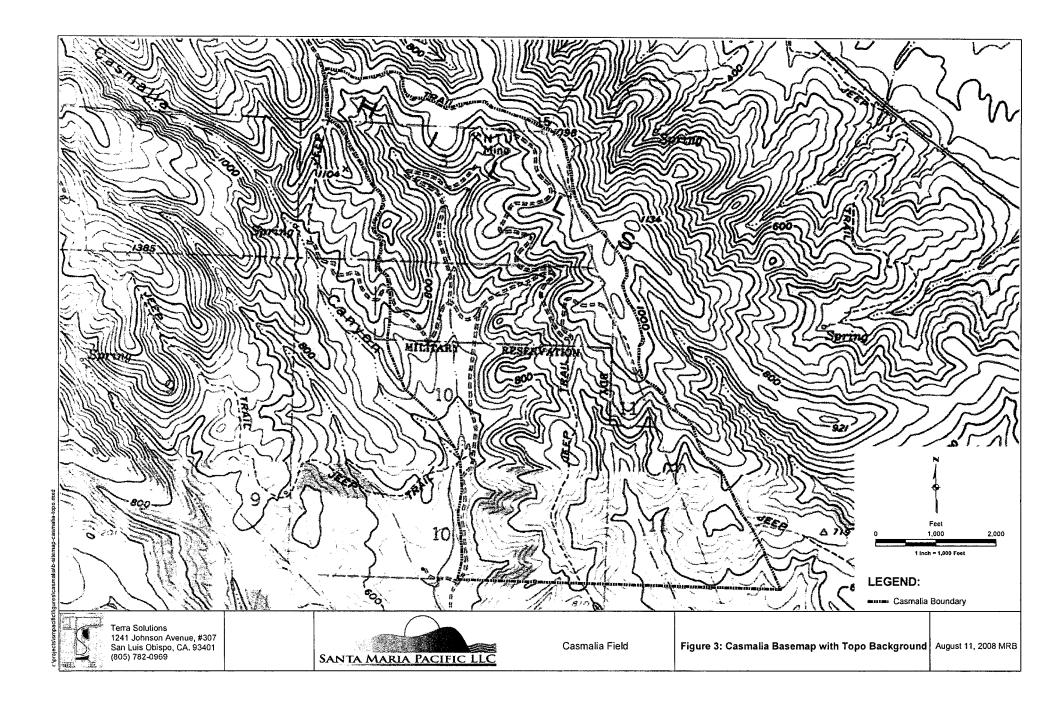
Figures:

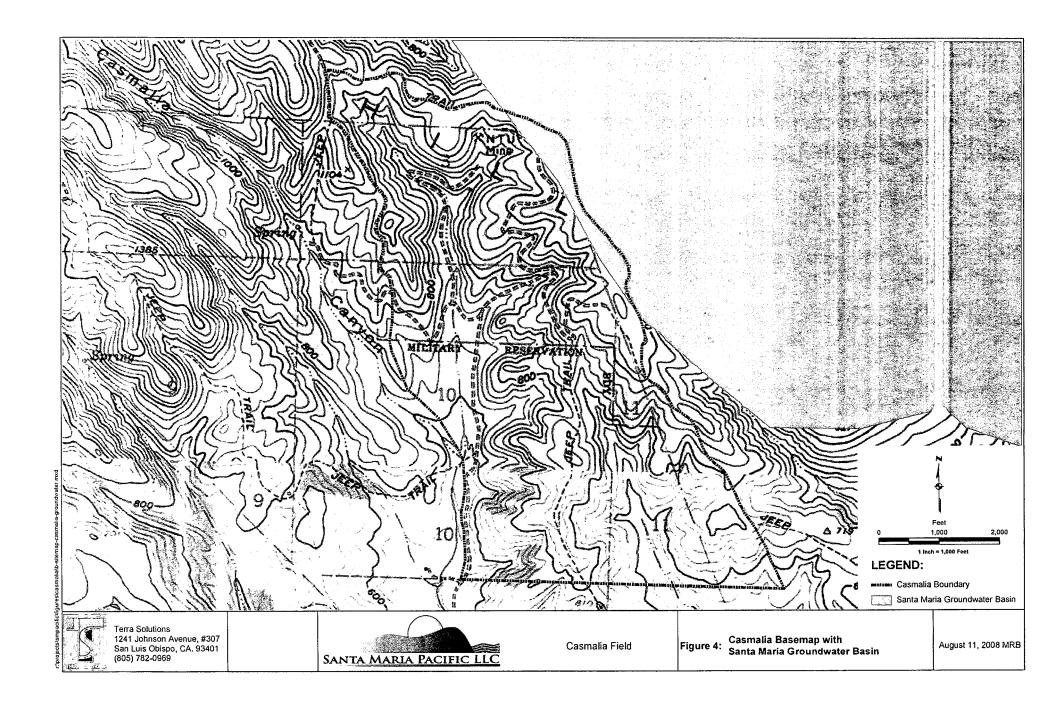
- Figure 1 Site Vicinity
- Figure 2 NW Casmalia Base Map with Aerial Photo
- Figure 3 NW Casmalia Base Map with Topo
- Figure 4 Casmalia Base Map with Regional Ground Water Basin
- Figure 5 Casmalia Base Map Showing Location of Casmite Corp. Water Supply Well

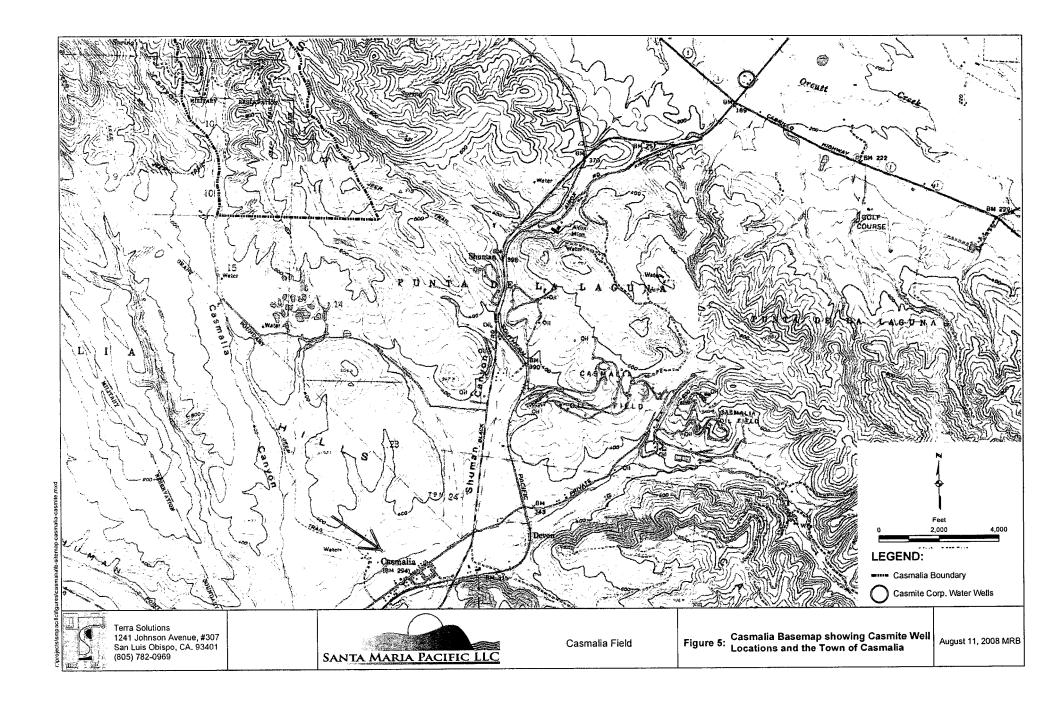
Attachments:

- Attachment 1 SMP Approval Request Letter to DOGGR dated 4/4/07
- Attachment 2 Water Injection Test Report "Stokes B" 30511 Well
- Attachment 3 DOGGR Notice Receipt Acknowledgement dated August 13, 2007
- Attachment 4 2008 SPE Western Regional Pacific Section AAPG Joint Meeting, April 1, 2008. SMP's Casmalia Presentation.
- Attachment 5 OEC Laboratory Reports Analytical Results Representing Casmalia Monterey Formation Fluid – "Stokes B" 30511









ATTACHMENT 1:

SMP APPROVAL REQUEST LETTER TO DOGGR (DIVISION 3) DATED APRIL 4, 2007



April 4, 2006

Department of Conservation Division of Oil Gas and Geothermal Resources (DOGGR) District 3 5075 S. Bradley Rd., Suite 221 Santa Maria, CA 93455-5077

RE:

Proposed Oilfield Water and Steam Injection in Casmalia Hills

An Apparent Casmalia Field Extension

Santa Barbara County

PROPOSED BY:

Santa Maria Pacific LLC

Santa Maria Pacific LLC requests DOGGR approval to inject steam into the Sisquoc for enhanced oil recovery and produced water from the Sisquoc into the upper Monterey Formation for testing secondary recovery in the subject area located Sections 3 and 10 of T9N/R10W of MDB&B.

The attached report provides the necessary and pertinent information. We are available to discuss whatever questions you might have. Please call me at any time.

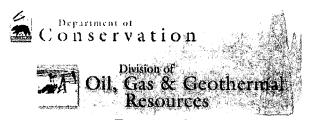
Sincerely,

Ramon Elias President

PRODUCED WATER INJECTION PROJECT

Casmalia Area A Proposed Field Extension

Submitted to



DISTRICT 3
5075 S. Bradley Road, Suite 221
Santa Maria, CA 93455-5077

Ву



SANTA MARIA PACIFIC LLC P.O.BOX 7202 • SANTA MARIA CA • 93456-7202 PHONE: 805-489-9901 • FAX: 805-489-9902

INTRODUCTION

Santa Maria Pacific LLC (SMP) is preparing to initiate production in an area considered by its technical team to be a northwest extension of the Casmalia oil field, in northwest Santa Barbara County. Geologic analysis demonstrates that both the Pliocene Sisquoc and Miocene Monterey formations encountered in the SMP wells drilled in Casmalia Hills on Sections 3 and 10 of T9N/R35W, MDBM, are continuous extensions of the productive areas that exist within the main Casmalia oil field. Published work by Farley and Wilson (1983 Pacific Section SEPM volume on Petroleum Generation and Occurrence in the Monterey Formation) demonstrate that the oil in the Sisquoc originated in the Monterey and represents leakage from that pool at the Airox deposit in the Casmalia Oil Field. The accumulation of hydrocarbons in the Sisquoc at the nearby NTU mine, a location included within the SMP project area, is similar and continuous with Airox. SMP's pilot cyclical steam stimulation project is located in the immediate vicinity of the NTU mine, which is about 2.3 miles northwest of Black Road at the abandoned Airox mine project.

Oil and gas production from the Casmalia oil field since 1905 is known to have caused widespread pressure depletion within the field. The Sisquoc and Monterey formation in the northwest area is geologically continuous and in hydraulic communication with the main the Casmalia oil field. Therefore, it is reasonable to expect depleted pressure conditions in the northwest area too. The recent drilling of 13 new wells and a lack of significant pressure seen in both the Sisquoc and Monterey formations supports this observation.

Production plans for the Casmalia Hills extension area calls for the application of unconventional cyclic steam methods to stimulate production from the oil bearing diatomaceous Sisquoc zone, which lies conformably above the Monterey. At the time of this application the property had 12 newly drilled wells capable of production. Seven additional wells are currently being drilled. Plans call for drilling another 23 wells over a 12-month period following the 7-wells mentioned above.

Production testing of the Monterey formation induced by water injection is also planned. Three of the newly drilled wells penetrate through the Sisquoc into parts of the Upper Monterey, with good hydrocarbon indications. A synergistic development approach is proposed by SMP that involves taking produced water from the Sisquoc enhanced recovery cyclic steam operation and injecting it into the Upper Monterey to stimulate oil and/or gas flow using water injection secondary recovery.

It appears that existing void space will first have to be filled in the upper Monterey, due to pressure depletion, prior to seeing hydrocarbon production. The corresponding Monterey water injection needs will accommodate all of the Sisquoc produced water from cyclic steaming operations for a period of 2 to 3 years when water breakthrough is estimated. The injected water should stimulate hydrocarbon production from up-dip Monterey producers. Plans call for injecting water in the structurally low Stokes B 30511 in the upper Monterey formation, after a production test is performed, as cyclic steam injection operations begin in the Sisquoc.

No shallow fresh water sands exist in the proposed development area. Open hole logs and cores show continuous hydrocarbon bearing pore space is seen from surface to the T.D. of all new wells drilled.

Wells Stokes B 31622 and Stokes B 30824 will be completed as Monterey producers. No offset oil and gas operations exist within 2 miles.

DOGGR approval is requested to proceed.

ENGINEERING STUDY

1. Purpose of project

Based on the interpretation that this project area is an extension of the Casmalia oil field, SMP is submitting this permit application for disposal of waste water into the upper 200 feet of the Monterey formation in Stokes B 30511 (Section 3,T9N, R35 W, MDBM).

2. Reservoir characteristics of the upper Monterey formation (established from both surface and down hole logging analysis and DOGGR publications)

Fracture Porosity: 2-3% Matrix porosity: 25-35%

Permeability: 0.1-200 mlD

Thickness: 200 ft.

Estimated areal extent: 500 acres

Estimated fracture gradient: 0.7–1.1 psi/ft.

	<u>Original</u>	<u>Present</u>	
So	0-25%	0-25%	
Sg	0-10%	0-10%	
T	85 ∘F	85°F	
p	500 psi (est.)	150 psi (est.)	at 1,150 feet

3. Reservoir Fluid Data for the Monterey Formation

Oil gravity: 8-23° API (est.)

Oil viscosity: 180 cp (est.)

Water quality: 400 gr/gal (6840 ppm) tds

Specific gravity of gas: 0.6 (est.)

4. Casing diagrams

There are two abandoned wells in the vicinity. There is no fresh water zone above the Monterey in the Sisquoc. All wells drilled to date have a continuous oil column from surface to the upper Monterey and therefore are not subject to USDW regulations.

See Appendix G for casing diagram of Stokes B 30511.

5. Planned well drilling, plugging, and abandonment program to complete project: Stokes B 30511 is drilled and standing idle for completion.

GEOLOGIC STUDY

- 1. Structural contour map top of Monterey formation: See Appendix A.
- 2. Isopachous data of the injection zone (top of Monterey) in project area: See Appendix B.
- 3. Geologic cross section from Stokes B 30511 in the cyclic steam stimulation area to the northern boundary of the Casmalia Oil Field: See Appendix C.
- 4. Representative electric log: See Appendix D.

INJECTION PLAN

- 1. Map of injection facilities: See Appendix E.
- 2. Maximum anticipated surface injection pressure (pump pressure): 350 to 750 psi, dependent on demonstrated fracture pressure.

Requested daily rate of injection: 4,500 barrels per day.

3. Monitoring system utilized to ensure that no damage is occurring and that the injection fluid is confined to the intended zone or zones of injection.

Well to be completed isolating fluid from casing with packer. Disposal pump system will be equipped with a safety shut down system to prevent injection above fracture pressure.

- 4. Method of injection
 - i Perforate from 1,300 ft. to 1,400 ft. and stimulate as needed.
 - ii Evacuate well bore using coiled tubing unit and nitrogen. Allow fluid level to equilibrate to demonstrate reservoir pressure.
 - iii Swab in well to collect sample of formation fluids. If commercial hydrocarbons are found, install rods and tubing for hydrocarbon recovery. If sub-commercial hydrocarbon concentrations are encountered begin actions to convert well to waste water disposal.
 - iv For conversion to waste water service install 2 3/8 in. tubing to 1,380 ft. with isolation packer set at 1,250 ft.
 - v To demonstrate maximum injection pressure, use a pressure monitoring device at the surface. When the maximum pressure has been reached record the surface pressure for waste water disposal system pressure control.
 - vi Install waste water pumps and service piping to Stokes B 30511.
- 5. Proposed cathodic protection measures for plant, lines, and wells: Not applicable.
- 6. Treatment of water to be injected: Tank settling of the water to allow for oil removal and solids settling.
- 7. Source of water: Safe, recycled sewage water provided by Laguna Sanitation Company.

Analysis of injected water: 3,000 ppm tds (est.)

8. Location and depth of each water-source well that will be used in conjunction with project: Well locations: See Appendix E.

Wells Within One Qua	rter Mile Of	Stokes B	30511
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144 44 44				pase or			Top of Monterey
Well Name	API#	Drilled TD (SS f/GL)	• • • • • • • • • • • • • • • • • • • •	Fresh Water	Well Status	Plugs	Injection Zone
Righetti 2040		2250 (-1168)	2,207	None	Drilled but not completed	None	Not reached.
Stokes B 2010		1740 (-299)	1,730	None	Drilled but not completed	None	Not reached.
Stokes A 3010		1750 (-724)	1,711	None	Drilled but not completed	None	Not reached.
Stokes A 3020		1760 (-735)	1,753	None	Drilled but not completed		Not reached.
Stokes A 3020		2070 (-1069)	2,054	None	Drilled but not completed		Not reached,
Stokes A 3030		1600 (-605)	1,600	None	Drilled but not completed	None	Not reached.
Stokes A 3030		1370 (-392)	1,340	None	Drilled but not completed		Not reached.
Stokes A 3040-		1422 (-449)	1,422	None	Drilled but not completed		Not reached.
Stokes A 3080		1450 (-590)	1,429	None	Drilled but not completed		-300
Stokes B 3051		1465 (-500)	1,456	None	Drilled but not completed		-300
Core Hole R-15 (Union	083-21279	463 (+461)	2 7/8 @ 44'	None	Abandoned 10/17/79	Plugged with cement 213'	Not reached.
						to surface.	mot readrica.
Core Hole R-16 (Union	083-21280	567 (+299)	2 7/8 @11'	None	Abandoned 11/02/79	Plugged with cement 92' to	Not reached.
						surface.	Not reached.
Core Hole T-20 (Union	083-21216	506 (+347)	no record	None	Abandoned 11/29/79	Plugged with cement 50' to	Not reached.
						surface.	Not reached.
Core Hole U-19 (Union)	083-21281	585 (+433)	2 7/8@ 22'	None	Abandoned 11/27/79	Plugged with cement 100'	Not reached.
						to surface.	rect reported.
Core Hole V-18 (Union)	083-20961	545 (+215)	no record	None	Abandoned 07/14/79	Plugged with cement 65' to	Not reached.
						surface.	not read lea
Core Hole V-19 (Union)	083-21283	557 (+277)	2 7/8 @ 10'	None	Abandoned 12/10/79	Plugged with cement 100'	Not reached.
						to surface.	TTOT TCGOTTCG,
M.V. Stokes Estate 3 (Oryx)	083-20063	705 (+191)	None	None	Abandoned 04/19/68	Plugged with cement 100'	Not reached.
						to surface	Not reached.
Chevron A-1		1202 (-140)	3" Idd at 356'	None	Abandoned 12/23/52	Filled hole with heavy mud	Not reached.
						and set 10-foot cement plug	Not readiled.
						at the surface.	
Chevron A-2		728 (+222)	no record	None	No Record	No Record	Not reached
							inot reactied.

- 9. Copies of letters of notification sent to offset operators: No adjacent operators.
- 10. Fill-up time:

$$W_{fo} = V_p \; x \; \Delta S_g = 4,363,875$$
 barrels, Injected water volume at reservoir fill-up.

$$V_p$$
 = 7758 A h ϕ = 7758 x 500 x 250 x 0.03 = 29,092,500 barrels, Pore Volume Approximate area (A): 500 acres

Zone thickness (h): 250 feet

Porosity (ϕ) = 3%

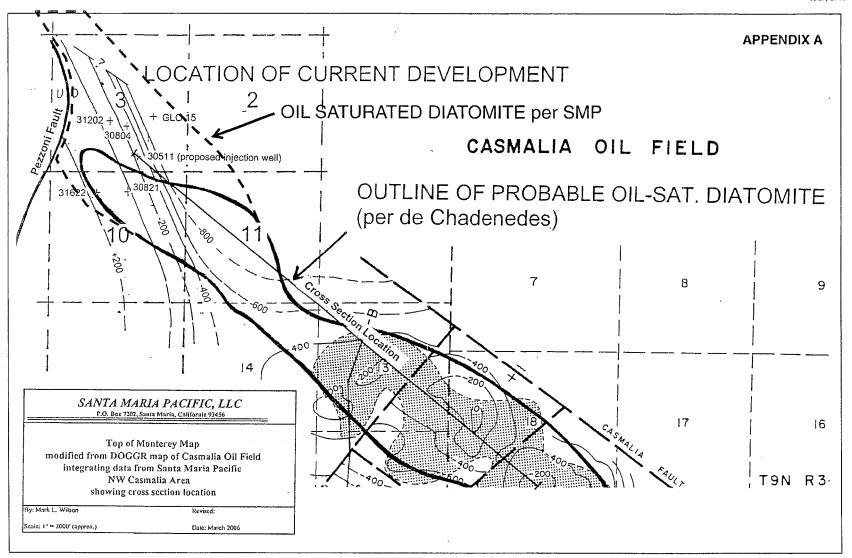
$$\Delta S_g \equiv (S_g - S_{gi}) \equiv 0.15$$
, Gas displaced

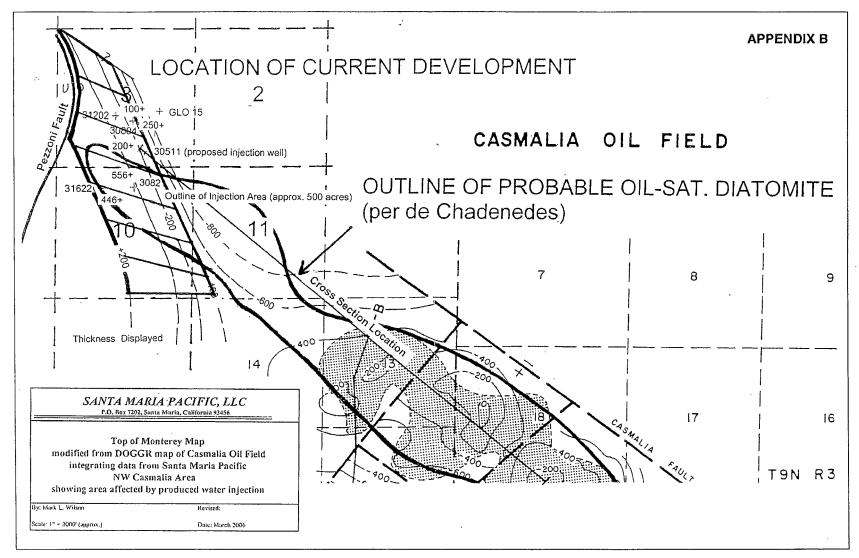
Where:
$$S_g = 0.20$$
, Initial gas saturation $Sgr = 0.05$, Residual gas saturation

iw = 4,500 bwpd, Water injection rate

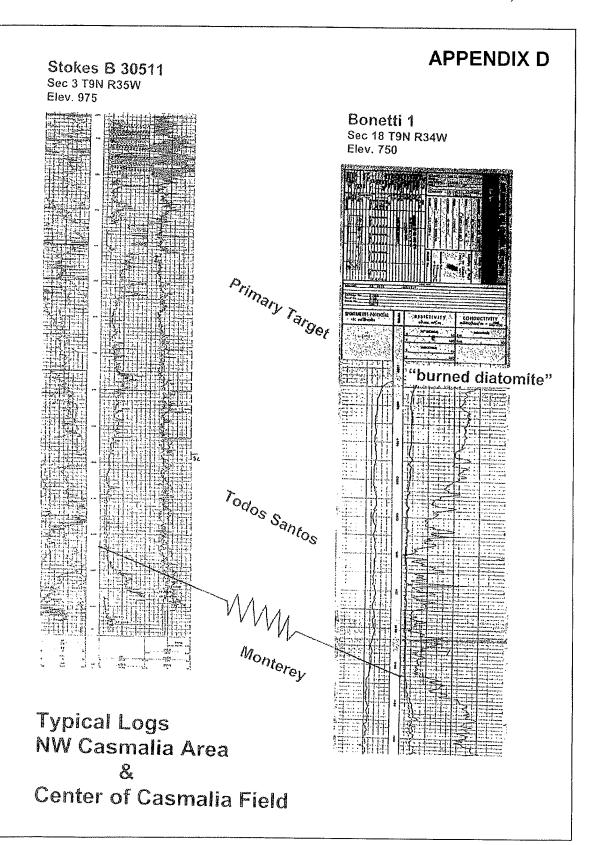
$$t_{\rm fu} = W_{\rm fu} \: / (i_w \: x \: 365) = 2.66$$
 years, Fill-up time

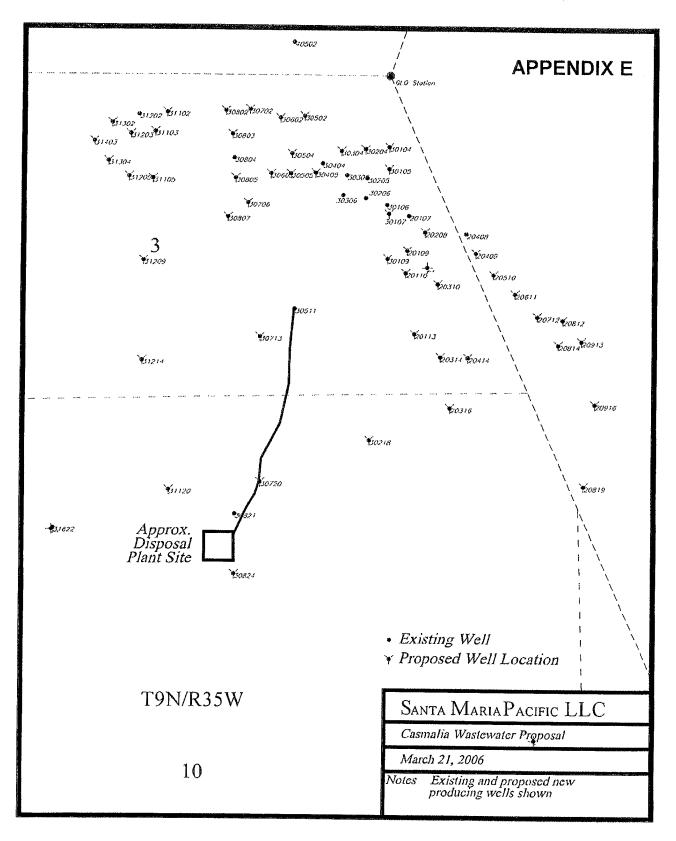
Appendix of Supporting Documentation and Work Proposals





APPENDIX C NW SE +2000 **Ground Surface** Upper Sisquoc S. L. **Primary Target** Monterey - 2000 SANTA MARIA PACIFIC, LLC P.O. Box 7202, Santa Maria, California 93456 Cross Section NW to SE showing relationship NW Casmalia Area to Casmalia Field submitted to show continuity of reservoirs By: M. L. Wilson Scale: '1" = 2000' (approx.) Date: March 2006





FOR DIVISION USE ONLY

3-29-06

Forms

RESOURCES AGENCY OF CALIFORNIA DEPARTMENT OF CONSERVATION DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

NOTICE OF INTENTION TO REWORK / REDRILL WELL

Document not

C.E.Q.A. INFORMATION (when redrilling or deepening only)

				required by local		Bond	OGD114	OGD121	File
	Class	S.C.H. No.	S.C.H. No,	jurisdiction 🔲					***************************************
	<u> </u>	See R	overse Side]	L		<u>[</u>	
This notice a information.)	and an indemnity or cast If operations have not o	n bond must be filed, and a commenced within one yea	approval given, bel ar of receipt of the	ore the rework/redrill be notice, this notice will be	gins. con:	(See the listered ca	reverse side nceled.	o for bondin	g
	In compliance with Se	ection 3203, Division 3, I	Public Resources	Code, notice is hereb	v aiv	en that it	is our inte	ntion to	
	well Stokes "B" 305	11			, 5		I No. 083-2		
(Circle one)		^	Woll designation)						No.
Sec. 3	T. 9N	R. 35 W	SBB.&M.					Casn	nalia Field
		Santa Barbara C	County,						
10 3/4" Cond 7" 23# K-55 L	luctor cemented at 50' TC cemented at 1,456'	well (present hole), includ		orations, is as follows:					
2. The total do	epth is: <u>Drilled TD 1465</u>		feet. The	effective depth is: 1413	3			 	feet.
3. Present co	mpletion zone (s): none		Anti	cipated completion zone	(s):	Monterev	formation		
		(Name)	_	•	.,			ime)	
 Present zor 	ne pressure: <hydrostat< td=""><td>ic</td><td>psi. Anti</td><td>cipated/existing new zon</td><td>ie pr</td><td>essure: <u>sa</u></td><td>me</td><td></td><td> psi.</td></hydrostat<>	ic	psi. Anti	cipated/existing new zon	ie pr	essure: <u>sa</u>	me		psi.
c t .									
5. Last produc	Ced: N/A (Date)	(Ot 00)							
(or)	(Date)	(Oñ, B/D)		(Water, B/D)			(Ga	as, McVO)	
(or) Last injecte	A· M/A								
Last injecte	(Date)	(Water, B/D)		(Gas, McVD)			/Sudan	pressure, psig	
The proposed perforate and	d work is as follows: (/ test 1300-1400'; if not v	e definition on the reverse A complete program is pre- vet acidize with high volun converting this interval to v	ferred and may be ne of 12/3 mud aci	Yes ☐ No ☒ attached.) d			(*******	,	
or redrilling o	r deepening:								
		(Proposed botto	om-hole coordinates)			(Esti	mated true veri	ical depth)	
The division r	nust be notified If char	nges to this plan become	a necessary.					, ,	
lame of Operator Santa Maria Pa	acific			one Number 489-9901					
ddress P. O. Box 7202				a Maria, CA			**************************************	Zip Code 93456	
ame of Person Fili	ino Notice		Signat	150				1 2	

File in Duplicate

OG107 (7/97/GSR/5M)

Ramon Elias

ţ;

APPENDIX G

7" Casing Diagram

Santa Maria Pacific

Drilling Wellbore Diagram

Well Name: Stokes "B" 30511 Location: Sec. 3-T9N-R35W

State: Ca Well drilled: 2005 API#: 083-22399 Field: Casmalia

County: Santa Barbara

Type: Producing Well PBTD: 1,413'

Wellhead: 7"x3Mx7-1/16th KB = 975' GL = 965'

All measurements taken from KB

	Promitoda: 1 Admin's 17 February	JE - 500						
	10-3/4' Cond. to 50'		Csg. Info:	Length	Тор	Bottom	Drift ID	Burst
Drilling D	Pay (Timeline)	1 5	10-3/4"	50	0	50	10.036"	1,820
	Formation (Diatomite)		7" 23# K-55 LTC	1,456	0	1,456	6.241"	4,360
Day #1	MIRU NU BOPE test - OK.	\			·			
Day #2	Orlg. 1/ 50' to 150', LOST CIRC.							
	Drig. f/ 150' to 230' w/ partial returns		0.7108 5 -1-					
	Drig. f/ 230' to 391' w/ partial returns	-	9-7/8" hole					
Day #3	Drlg. 1/ 347' to 436', LOST CIRC.	Т Т	OC @ 650' (Bond Log)					
	Drlg. f/ 436' to 704', w/ full returns							
	Drlg. 1/ 704' to 927' w/ full returns							
	Drig. f/ 927' to 942' w/ full returns							
Day #4	Drig. f/ 942' to 1,090', LOST CIRC.							
	Drig. f/ 1,090' to 1186', LOST CIRC.							
)ay #5	Drig. # 1,186' to 1,300', LOST CIRC.							
·ωyπυ	Drig. 1/ 1,300' to 1,335', LOST CIRC.							
	Drig. 1/ 1,335' to 1,345', DRLG BLIND							
	Drig. 1/ 1,345' to 1,465', w/ full returns							
	Circ. for loggers RU Hall- for e-logs							
Day #6	E-log w/ triple combo. RU run 38 jts.							
y ". V	7" 23# K-55 csg. FC @ 1,413'.							
	Mix & pump 651 ft3 12.5 ppg cls. III cmt.							
	Lost cmt, returns while cmt. No cmt. to	1 41	3 (PBTD)					
	returns to surface.		6' (7' 23# K-55 LTC)					
	Drill	ed TD @ 1,465'		David Allred	2/27/2006			
		d Hole Costs ~\$21		DRII				
			•	DRII	TEK			

ATTACHMENT 2:

WATER INJECTION TEST REPORT – STOKES B 30511 WELL

INJECTION REPORT CORRECTIONS

OPERATOR NAME: Santa Maria Pacific, LLC, P.O. Box 7202, Santa Maria, CA 93456

	Inje	ction		*ode*	ype							ו Well אל ר
Operator Code*	Yr.	Mo.	API Well Number	Pool Code*	Well Type Code*	Water or Steam Injected (bbl)	Gas or Air Injected (Mcf)	No. Days Injected	Surface Inj. Pressure (psi)	Source of Water*	Kind of Water*	Reason Well Not Injecting*
	07	04	08322399		6	1050		4	216	1	ı	
	07	05	08322399		6	597		4	200	1	1	
	07	06	08322399		6	1323		4	230	1	1	
									4.000 a.c.			
						15-117-15-15-15-15-15-15-15-15-15-15-15-15-15-						
												<u></u>
												
												-
											-	

See legend on reverse side for codes.		
I HEREBY CERTIFY THAT THE INFORMATION HEREIN I	S TRUE AND COMPLETE TO THE BEST OF MY KNOWLE	DGE AND BELIEF.
NAME: Kevin P. Yung	TITLE: Production Manager	DATE: 7-14-2007
SIGNATURE:	PHONE NO.: 805-938-3320	
OG110BX		DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES

1.	Operato	r and Pool Codes are on the 110B forms sent monthly. If these codes are not available, all the local division district office for information.
	picase c	an the rocal division district office for information.
2.	Injection	Well-Type Codes:
	3	Gas storage
	4	Pressure maintenance
	5	Liquified gas
	6	Water disposal
	7	Waterflood
	8	Steamflood
	0	Air injection
	Α	Cyclic steam
3.	Source c	of Water Codes:
	1	Oil or gas well
	2	Water source well
	3	Domestic water system
	4	Ocean
	5	Industrial waste-water treatment
	6	Domestic waste-water treatment
	7	Other source or combination of above
4.	Kind of V	Valer Codes:
	1	Saline
	2	Fresh
	3	Chemically treated
	4	Other
5.	Reason l	Well Not on Injection Codes:
	1	Standing
	4	Uncompleted
	5	Abandoned or converted to another well type
	6	Shut down
	8	Other
	9	Transferred (operator change)

ATTACHMENT 3:

DOGGR NOTICE RECEIPT ACKNOWLEDGEMENT – AUGUST 13, 2007

RESOURCES AGENCY OF CALIFORNIA DEPARTMENT OF CONSERVATION DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES (805) 937-7246

NOTICE RECEIPT ACKNOWLEDGMENT

Richard Field, Agent Santa Maria Pacific LLC P.O. Box 7202 Santa Maria, CA 93456-7202

Santa Maria, California August 13, 2007

I have received your notice dated <u>July 30</u>, 2007, of <u>Notice of Intention to convert to water disposal</u> well, <u>"Stokes B" 30511 (083-22399)</u>, Sec. <u>3</u>, T. <u>9N</u>, R. <u>35W</u>, . <u>S.B. B.&M</u>.

There is not an official water disposal project in this area. The Division will be required to establish a project in this area prior answering any permits to convert an individual well.

The following items are needed to complete your project application.

- A letter of notification to the nearest operator, Greka Oil & Gas, Inc.
- An injection facilities schematic
- Contour map of the tope of the injection zone without probable and current diatomite limits (See CCR 1724.7(f)
- Labeled isopachous map of the injection zone without probable and current diatomite limits (See CCR 1724.7(f)

PA:cb

HAL BOPP, State Oil and Gas Supervisor

Deputy Supervisor

ATTACHMENT 4:

2008 SPE Western Regional Pacific Section AAPG Joint Meeting, April 1, 2008 - SMP's Casmalia Presentation 2008 SPE Western Regional and Pacific Section AAPG Joint Meeting Tuesday, April 1
CALIFORNIA OIL FIELDS II: FIELD REVIEWS



An Extension of a 100 Year Old California Oil Field

Casmalia Oil Field Santa Barbara County, California

Authors:

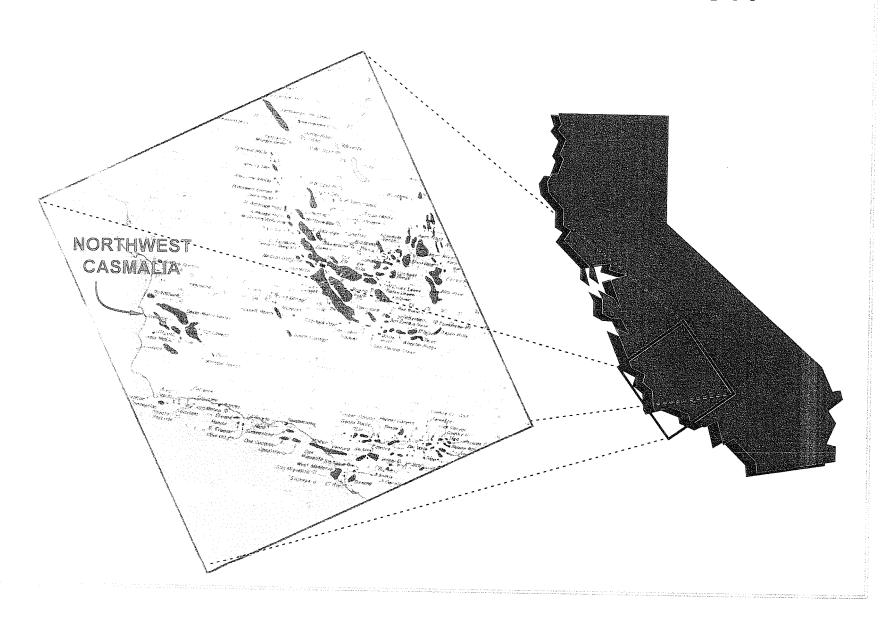
Ramon Elias, Santa Maria Pacific, LLC Mark L. Wilson, Santa Maria Pacific, LLC



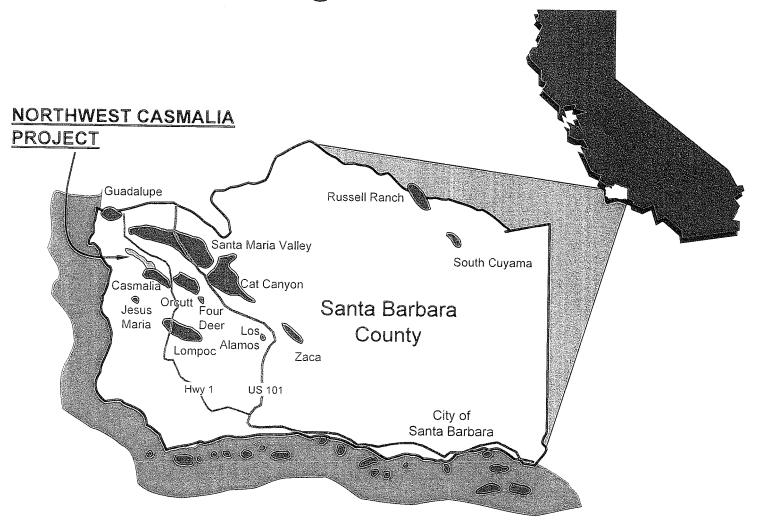
Introduction

- Santa Maria Pacific is delineating and testing a large oilsaturated diatomite reservoir located about 2 miles northwest of the 100 year old Casmalia Oil Field
- The diatomite is found in the Sisquoc formation which overlies the Monterey
- In Casmalia, there is oil-saturated diatomite in the Sisquoc which also serves as part of the productive Monterey formation cap rock system
- We believe:
 - Like in Casmalia, there is significant oil in the Monterey below the newly delineated oil saturated Sisquoc diatomite
 - As is the Sisquoc, the Monterey here is actually an extension of the productive Monterey formation located in the Casmalia field

Northwest Casmalia Location



Local Setting



Field Summary

Discovery Well

Discovery well drilled in May 1905

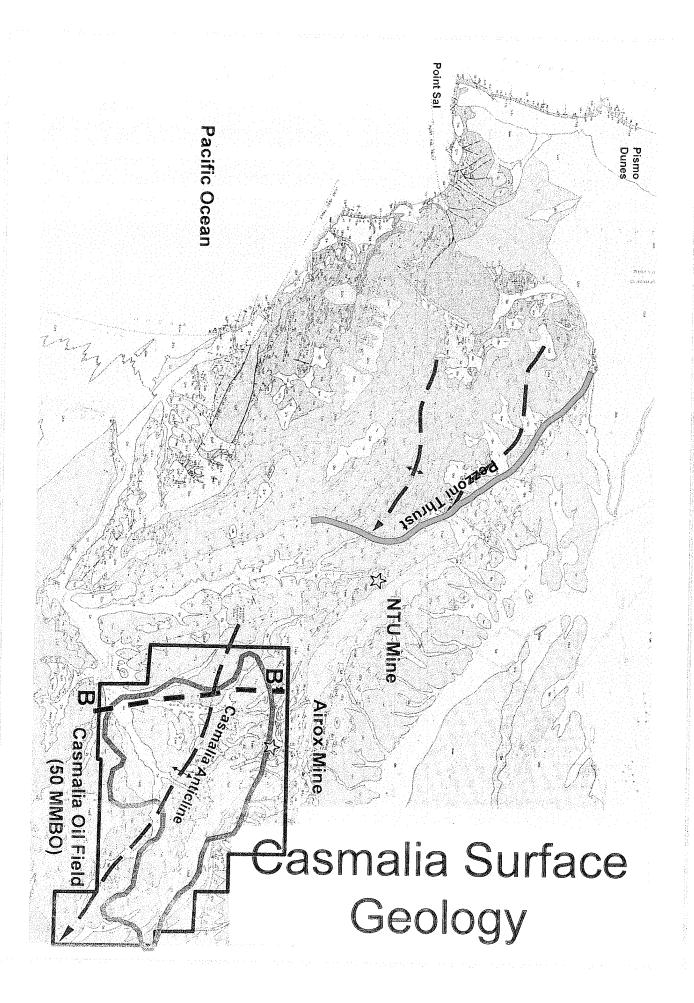
Kern Trading and Oil Company "S.P." 1

Zone Tot Monterey

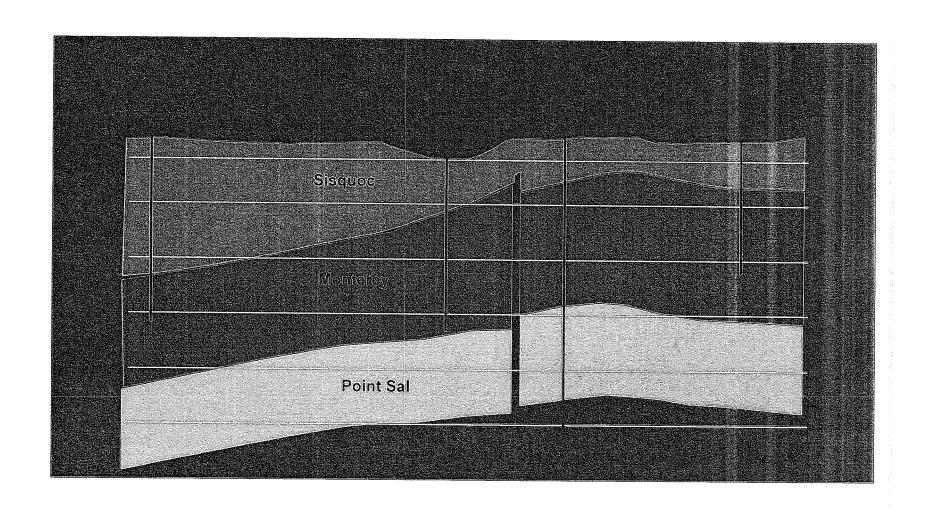
Total Depth 2750

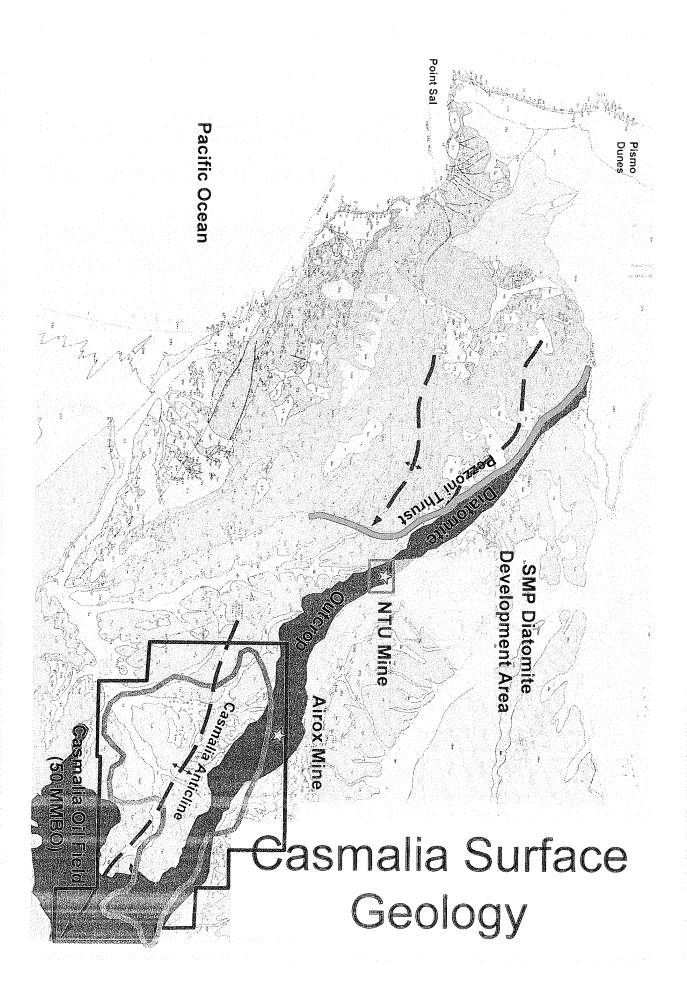
Location Section24, T.9N/R.35W, S.B.B.&M.

	Formation Summar	y	
<u>ltem</u>	Monterey	Point Sal	Lospe
Initial Production	May 1905	January 1916	April 1946
BOPD, IP	20-40	-	275
Initial Pressure, psi	300-1,300	1,500	2,500
Reservoir Temperature, deg-F	80-130	140	160
Oil Content, STB/ac-ft	400	190	90
Depth, ft	700-2,800	2,750	3,950
Thickness, ft	300-1,000	500	350
Porosity, %	15-24	15	10
S _{wi} %	50-60	50-60	50-60
Oil Gravity, deg-API	7-25		
Sulfur content, % by wt.	2.8		
Total Dissolved Solids of Water, ppm	6,000-15,000		
Peak production in 1965, bopd	4000		
Recovery Methods Used Over Time	Primary	Primary	Primary
	Hot Water		•
	Water Flood		
	Cyclic Steam		

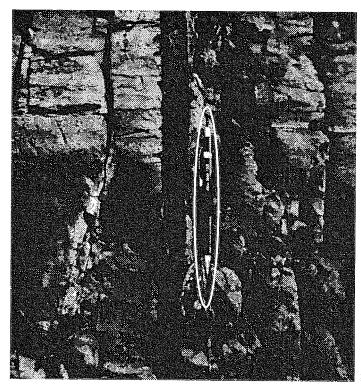


Cross Section B-B'



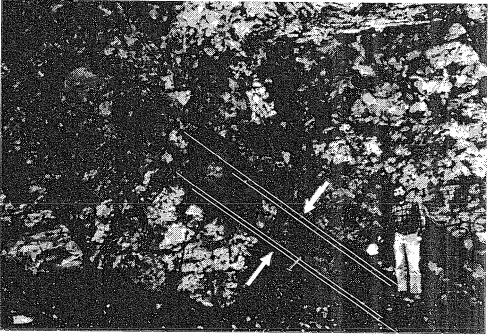


Possible Sisquoc and Monterey Oil Connection



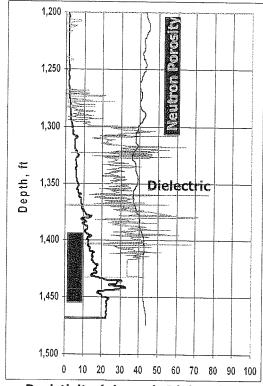
Shown above is a sand filled vertical fracture situated within diatomaceous rock at Airox in the Casmalia Oil Field. Bedding is nearly horizontal. Note pen for scale.

Shown below is a sand filled vertical fracture in the east wall of the north trending Airox quarry. Fracture strikes N75°W and dips 45°S. Bedding plane strikes N60°W and dips 10°N.



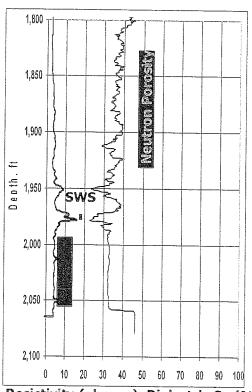
Northwest Casmalia Monterey Saturation Observations

Stokes B 30511 Section 3 T9N R35W Elevation: 975 ft



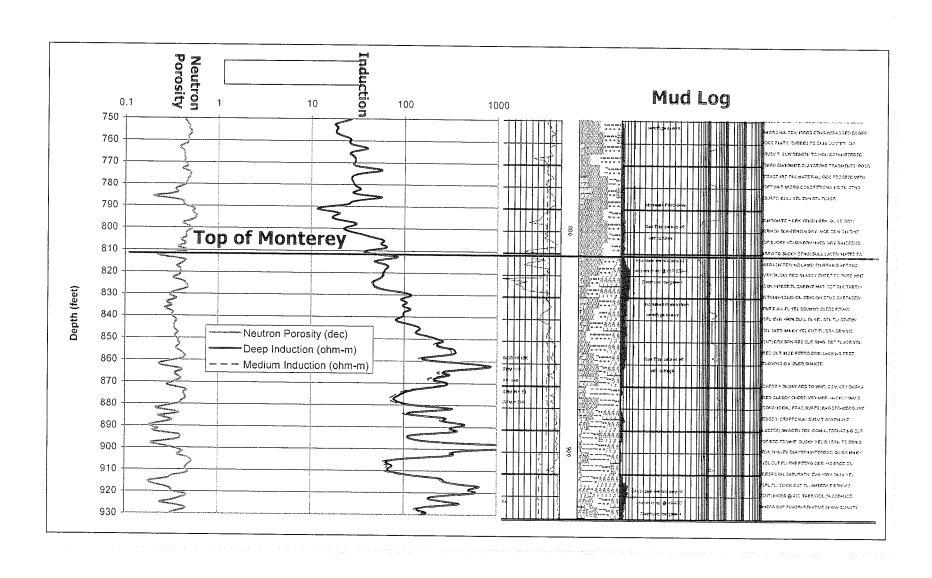
Resistivity (ohm-m), Dielectric So (%), Neutron Porosity (%)

Stokes A 30206 Section 3 T9N R35W Elevation: 975 ft



Resistivity (ohm-m), Dielectric So (%), Neutron Porosity (%), SWS So (%)

Monterey formation oil shows in Stokes B 30821



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1 "15"	E 8	3
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COURTY	FARE WELL RO	,
Sunfa Bet	Stokes /	
Comelie	1100'F and 1000'N of	يبززي
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	corner of Section 3	
9 35	2 + 76	2
	CONTRACTOR	
	(
	SONNERCEO 6 - 23 - 17	
 	COMPLETED / - 10 - 19	
Actions	HIMGEOLOGY FILE	
PRODUCTION	UNION OIL CO.	
Dry Hole	EXPLODE TION DETE	
	ASTA RECEIPED CER	
	OPCULT, SALIF.	A27
	8× /627	
30.	6K*	
	50.	
184'	28.	
22% 575 \$401		
- #91	QUARTE SERWED	
FORM 194 - In 15	och and for sate by Wie West Pity. Co., Tolis	
- Francisco		
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Earliest Northwest Casmalia Monterey Hydrocarbon Production & Shows

Stokes 1
United Western Consolidated
Section 3 T9N R35W
Year: 1917

Coorse dark sand may refer to
dark brown and black chart cuttings

Coarse blk sand

Tas-748! string of tools 12: "bit,
drilled by and cannot off and

10" cag."

Gy sand

"At 186' well produced 1,125,000 cutt
per day of sulphar gas which was
tosted for 6 works, this diminished to
too,000 cutt, After getting 10" csg.

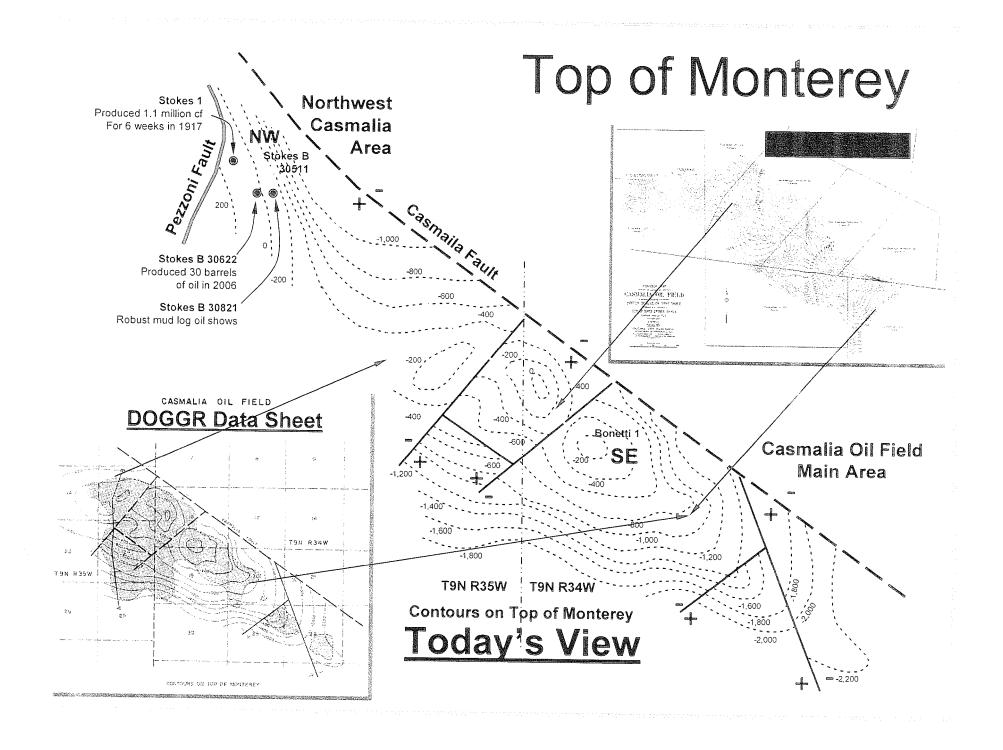
thru yas cands, gos diminished to
sooc cut fi per day, wall is still

producing some gas between 10"
and 12:" ssg. which was used for
fuel during operations."

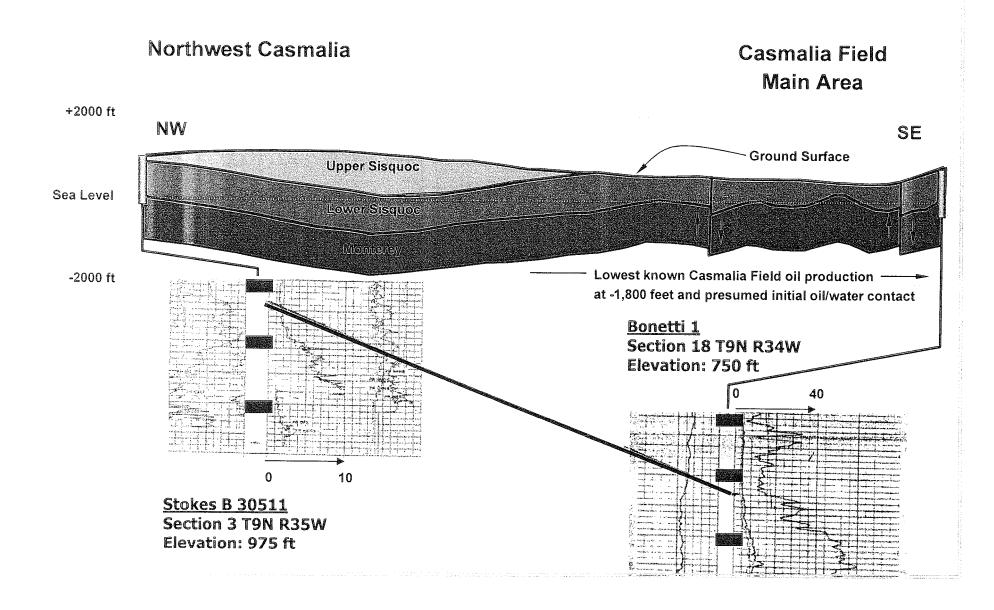
Some of the more significant hydrocarbon shows

Recent shows:

- Mud log from SMP's 30821 drilled in 2005 has robust shows across the Monterey
- The di-electric log calculates 25-40% oil saturation across the Monterey in well 30511
- A Monterey side wall core in 30206 shows good oil saturation
- Well 30622 was production tested and produced 30 barrels of 15 deg-API oil over 11 days.
- Original show: United Western Consolidated "Stokes No. 1" in 1919 produced more than a million cubic feet of gas per day for 6 weeks



NE-SW Cross-section



Advancing the theory

- A cross section drawn from the center of the Casmalia field to the center of the diatomite development shows that nearly the entire Monterey interval is above the lowest known oil in the Casmalia field
- The production test completed in wells 30511 and 30622 showed:
 - Significant hydrocarbon recovery
 - Lower than normal reservoir pressure was measured
- While one could say the lower than normal original reservoir pressure is original, it is believed that the low pressure is a result of production from the main Casmalia producing area

Conclusions

- Surface geology provides important clues towards showing the presence of a Casmalia Field reservoir extension.
- The original field limits to the northwest appear to have been decided more by reservoir productivity and less by applied geosciences.
- Today's understanding of the Monterey formation, coupled with modern development and production methods and high oil pricing, is expected to extend the productive horizons and producing life of this previously thought tired old oil field.



Client: Santa Maria Pacific LLC.

P.O. 7202

Santa Maria, CA 93456

Attn: Ramon Elias Project: Stokes 30511 Client ID: Stokes 30511 Matrix: Aqueous SAMPLE ID: 06-1736-4 Date Received: 8/2/06 Date Sampled: 8/2/06

Lab Contact: J. Carstens

Report Of Analytical Results								
Constituent	Analysis Results	Reporting Units	PQL	Method	Analysis Date			
Chloride Conductivity	840 8900	mg/L µmhos/cm	40 10	EPA 300.0 SM 2510	8/3/06 8/3/06			

PQL = Practical Quantitation Limit

Results listed as ND would have been reported if present at or above the listed PQL

Raised PQL's due to dilution



Client: Santa Maria Pacific LLC.

P.O. 7202

Santa Maria, CA 93456

Attn: Ramon Elias Project: Casmalia Field Client ID: 30511 Water Sample

Matrix: Aqueous

SAMPLE ID: 06-1876-1 Date Received: 8/16/06 Date Sampled: 8/16/06

Lab Contact: J. Carstens

Report Of Analytical Results

Commetter and	Analysis	Reporting			Analysi
Constituent	Results	Units	PQL	Method	Date
Alkalinity	1700	mg/L	2.0	SM 2320B	8/24/06
Chloride*	930	mg/L	40	EPA 300	8/17/06
Conductivity*	9700	µmhos/cm	20	SM 2510	8/17/06
Nitrate as N*	ND	mg/L	4.0	EPA 300	8/17/06
Nitrite*	ND	mg/L	4.0	EPA 300	8/17/06
pН	8.5	units	0.1	EPA 150.1	8/22/06
Sulfate*	1400	mg/L	40	EPA 300	8/17/06
TDS*	5400	mg/L	100	EPA 160.1	8/25/06
Calcium*	55	rng/L	5.0	EPA 6020	8/23/06
Hardness*	140	mg/L	5.2	EPA 6020	8/23/06
Copper*	0.027	mg/L	0.002	EPA 6020	8/23/06
lron*	0.11	mg/L	0.05	EPA 6020	8/23/06
Potassium*	2.2	mg/L	0.2	EPA 6020	8/23/06
Magnesium*	0.9	mg/L	0.2	EPA 6020	8/23/06
Manganese*	ND	mg/L	0.01	EPA 6020	8/23/06
Sodium*	80	mg/L	5.0	EPA 6020	8/23/06
Zinc*	0.028	mg/L	0.002	EPA 6020	8/23/06

PQL = Practical Quantitation Limit

Results listed as ND would have been reported if present at or above the listed PQL

* Raised PQL's due to dilution



Client: Santa Maria Pacific LLC. P.O. 7202

Santa Maria, CA 93456 Attn: Ramon Elias Project: Stokes Field Client ID: Stokes 30511 Matrix: Aqueous SAMPLE ID: 06-1814-1 Date Received: 8/9/06 Date Sampled: 8/9/06

Lab Contact: J. Carstens

Report Of Analytical Results							
Constituent	Analysis Results	Reporting Units	PQL	Method	Analysis Date		
Chloride Conductivity	860 9200	mg/L µmhos/cm	40 20	EPA 300.0 SM 2510	8/10/06 8/10/06		

PQL = Practical Quantitation Limit

Results listed as ND would have been reported if present at or above the listed PQL

Raised PQL's due to dilution



Client: Santa Maria Pacific LLC.

P.O. 7202

Santa Maria, CA 93456

Attn: Ramon Elias

Project: Stokes 30511

SAMPLE ID: 06-1736-1->4

Date Sampled: 08/02/06

Date Analyzed: 08/03/06 Date Received: 08/02/06

Lab Contact: J. Carstens

Report Of Analytical Results							
OEC ID	Client ID	Constituent	Results	Units	Method	PQL	
06-1736-1	Careaga # 7	API Gravity	14.6	API	ASTM D-287	0.1	
06-1736-2	Careaga # 11	API Gravity	15.0	API	ASTM D-287	0.1	
06-1736-3	Careaga # 12	API Gravity	14.4	API	ASTM D-287	0.1	
06-1736-4	Stokes 30511 (Water)	API Gravity	9.0	API	ASTM D-287	0.1	

ND - Not Detected at or above the PQL (Practical Quantitation Limit)



Client: Santa Maria Pacific LLC.

P.O. 7202

Santa Maria, CA 93456

Attn: Ramon Elias

Project: Stokes 30511

SAMPLE ID: 06-1814-1

Date Sampled: 08/09/06

Date Analyzed: 08/11/06

Date Received: 08/09/06

Lab Contact: J. Carstens

Report Of Analytical Results							
OEC ID	Client ID	Constituent	Results	Units	Method	PQL	
06-1814-1	Stokes 30511 (Water)	API Gravity	9.0	API	ASTM D-287	0.1	

ND - Not Detected at or above the PQL (Practical Quantitation Limit)



Client: Santa Maria Pacific LLC

P.O. 7202

Santa Maria, CA 93456

Attn: Ramon Elias

Project: Casmalia Field

SAMPLE ID: 06-1876-1

Date Sampled: 08/16/06

Date Analyzed: 08/18/06

Date Received: 08/16/06

Lab Contact: J. Carstens

Report Of Analytical Results							
OEC ID	Client ID .	Constituent	Results	Units	Method	PQL	
06-1876-1	Stokes 30511 (Water)	API Gravity	8.9	API	ASTM D-287	0.1	

ND - Not Detected at or above the PQL (Practical Quantitation Limit)